WHAT IS CLAIMED IS:

1. A substrate inspection system comprising:

a substrate mounting part which mounts thereon a substrate to be inspected;

a charged particle beam irradiation part which generates a charged particle beam to irradiate the substrate with the charged particle beam, the irradiation of the charged particle beam causing a secondary charged particle and/or a reflected charged particle to generate from the substrate;

an electron image detecting part which detects an electron image which is formed by the secondary charged particle and/or the reflected charged particle and is indicative of a physical property of the surface part of the substrate and outputs a picture signal of the image; said electron image detecting part including a charged particle multiplying device which multiplies the secondary charged particle and/or the reflected charged particle, and an image grabbing element having a fluorescent body which receives the multiplied secondary charged particle and/or reflected charged particle as the electron image and which converts the electron image into an optical image, said image grabbing element converting the optical image into the picture signal; said charged particle multiplying device having an entrance surface through which the secondary charged particle and/or the reflected charged particle enter said charged particle multiplying device; said fluorescent body having a light receiving surface which receives the multiplied secondary charged particle and/or reflected charged particle and a fluorescent surface on which the optical image appears;

a mapping projecting part which projects the secondary charged particle and/or the reflected charge particle in some degree of magnification on said electron image detecting part;

an inspection part which inspects the substrate on the basis of the picture signal; and

a control part which causes said fluorescent surface of said fluorescent body to be grounded and which applies a first negative potential to the entrance surface of said charged particle multiplying device.

2. A substrate inspection system according to claim 1, wherein said control part applies a second negative potential to the substrate mounting part, the absolute value of said second negative potential being greater than the absolute value of said first negative potential.

3. A substrate inspection system according to claim 1, wherein said control part controls said mapping projecting part so that a potential at a position at which the secondary charged particle and/or the reflected charged particle leave said mapping projecting part is said first negative potential.

4. A substrate inspection system according to claim 2, wherein said control part controls said mapping projecting part so that a potential at a position at which the secondary charged particle and/or the reflected charged particle leave said mapping projecting part is said first negative potential.

5. A substrate inspection system according to claim 3, wherein said mapping projecting part includes three-stage electrostatic lenses which are provided in the vicinity of said electron image detecting part, of the three-stage electrostatic lenses a first-stage electrostatic lens being positioned nearest to the substrate mounting part, a third-stage electrostatic lens being positioned nearest to said charged particle multiplying device and a second-stage electrostatic lens being positioned between the first-stage electrostatic lens and the third-stage electrostatic lens, and

said control part causes the first-stage electrostatic lens to be grounded, applies said first negative potential to the third-stage electrostatic lens and applies a third negative potential to the second-stage electrostatic lens, the absolute value of said third negative potential being smaller than the absolute value of said first negative potential.

6. A substrate inspection system according to claim 4, wherein

said mapping projecting part includes three-stage electrostatic lenses which are provided in the vicinity of said electron image detecting part, of the three-stage electrostatic lenses a first-stage electrostatic lens being positioned nearest to the substrate mounting part, a third-stage electrostatic lens being positioned nearest to said charged particle multiplying device and a second-stage electrostatic lens being positioned between the first-stage electrostatic lens and the third-stage electrostatic lens, and

said control part causes the first-stage electrostatic lens to be grounded, applies said first negative potential to the third-stage electrostatic lens and applies a third negative potential to the second-stage electrostatic lens, the absolute value of said third negative potential being smaller than the absolute value of said first negative potential.

7. A substrate inspection system according to claim 1, which further comprises a vacuum vessel for housing therein said substrate mounting part, said charged particle beam irradiation part, said mapping projecting part and said charged particle multiplying device in vacuum state, and

wherein said image grabbing element is installed in said vacuum vessel.

8. A substrate inspection system according to claim 1, which further comprises a charged particle beam deflecting part which changes an incident angle of the charged particle beam on the substrate and which changes an angle with which the secondary charged particle and/or the reflected charged particle are incorporated into said mapping projecting part.

9. A substrate inspection system according to claim 1, wherein the value of said first negative potential is selected so that the energy at which the secondary charged particle and/or the reflected charged particle are incident on said charged particle multiplying device is approximately 2 keV or less.

10. A substrate inspection system according to claim 1, wherein said image grabbing element has a protective member formed of a glass material, and said fluorescent body is formed by coating a fluorescent material on the surface of said protective member.

11. A substrate inspection system according to claim 10, wherein said image grabbing element further has an electrode which is provided between said protective member and said fluorescent body, said fluorescent body being grounded via said electrode.

12. A substrate inspection system according to claim 1, wherein said image grabbing element includes a TDI (Time Delay Integrator) type CCD element.

13. A method for controlling a substrate inspection system comprising: a substrate mounting part which mounts thereon a substrate to be inspected; a charged particle beam irradiation part which generates a charged particle beam to irradiate the substrate with the charged particle beam; an electron image detecting part which detects an electron image which are formed by a secondary charged particle and/or a reflected charged particle which are produced from the substrate by irradiation with the charged particle beam and which is indicative of a physical property of the surface part of the substrate and which outputs a picture signal of the image; a mapping projecting part which projects the secondary charged particle and/or the reflected charge particle in some degree of magnification on said electron image detecting part; and an inspection part which inspects the substrate on the basis of the picture signal, said electron image detecting part including a charged particle multiplying device which multiplies the secondary charged particle and/or the reflected charged particle, and an image grabbing element having a fluorescent body which receives the multiplied secondary charged particle and/or reflected charged particle as the electron image and for converting the electron image into an optical image, said image grabbing element converting the optical image into

the picture signal, said charged particle multiplying device having an entrance surface through which the secondary charged particle and/or the reflected charged particle enter said charged particle multiplying device, said fluorescent body having a light receiving surface which receives the multiplied secondary charged particle and/or reflected charged particle and a fluorescent surface on which the optical image appears, said method comprising:

causing the fluorescent surface of said fluorescent body to be grounded, and

applying a first negative potential to the entrance surface of said charged particle multiplying device.

14. A method for controlling a substrate inspection system according to claim 13, which further comprises applying a second negative potential to the substrate mounting part, the absolute value of said second negative potential being greater than the absolute value of said first negative potential.

15. A method for controlling a substrate inspection system according to claim 13, which further comprises applying said first negative potential at a place at which the secondary charged particle and/or the reflected charged particle leave said mapping projecting part toward said electron image detecting part.

16. A method for controlling a substrate inspection system according to claim 14, which further comprises applying said first negative potential at a place at which the secondary charged particle and/or the reflected charged particle leave said mapping projecting part toward said electron image detecting part.

17. A method for controlling a substrate inspection system according to claim 15, wherein said mapping projecting part includes three-stage electrostatic lenses which are provided in the vicinity of said electron image detecting part, of the three-stage electrostatic lenses a first-stage electrostatic lens being positioned nearest to the substrate mounting part,

a third-stage electrostatic lens being positioned nearest to said charged particle multiplying device and a second-stage electrostatic lens being positioned between the first-stage electrostatic lens and the third-stage electrostatic lens, and said method further comprises causing the first-stage electrostatic lens to be grounded, applying said first negative potential to the third-stage electrostatic lens and applying a third negative potential to the second-stage electrostatic lens, the absolute value of said third negative potential being smaller than the absolute value of said first negative potential.

18. A method for controlling a substrate inspection system according to claim 16, wherein said mapping projecting part includes three-stage electrostatic lenses which are provided in the vicinity of said electron image detecting part, of the three-stage electrostatic lenses a first-stage electrostatic lens being positioned nearest to the substrate mounting part, a third-stage electrostatic lens being positioned nearest to said charged particle multiplying device and a second-stage electrostatic lens being positioned between the first-stage electrostatic lens and the third-stage electrostatic lens, and said method further comprises causing the first-stage electrostatic lens to be grounded, applying said first negative potential to the third-stage electrostatic lens and applying a third negative potential to the second-stage electrostatic lens, the absolute value of said third negative potential being smaller than the absolute value of said first negative potential.

19. A method for controlling a substrate inspection system according to claim 13, which further comprises changing an incident angle of the charged particle beam on the substrate and changing an angle with which the secondary charged particle and/or the reflected charged particle are incorporated into said mapping projecting part.

20. A method for controlling substrate inspection system according to claim 13, wherein the value of said first negative

potential is selected so that the energy at which the secondary charged particle and/or the reflected charged particle are incident on said charged particle multiplying device is approximately 2 keV or less.